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Floristic novelties in the Umbelliferae of Xinjiang, China

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Abstract Three genera (*Zosima* Hoffm., *Lithosciadium* Turcz., and *Lomatocarpa* Pimenov) were shown for the first time for the Chinese flora on the basis of collections kept in Ürtümqi [Institute of Biology, Pedology and Desert Investigations (XJBI), CAS]. In the same herbarium, some additional floristic novelties were found: two genera (*Pleurospermum* s. str. and *Kadenia*) and six species new for Xinjiang. A new species, *Dimorphosciadium shenii* Pimenov et Kljuykov has been described, being a Xinjiang endemic. Some corrections in taxonomy and nomenclature for local species of *Ferula*, *Seseli*, *Aphanopleura*, *Aegopodium*, and *Sium* have been proposed. In total, 126 species and 53 genera of the Umbelliferae are registered for Xinjiang.

Key words Plant taxonomy; Phytogeography; Umbelliferae; Xinjiang, China;

Xinjiang in its flora as a whole, as well as in its set of the Umbelliferae species, differs considerably from the rest of China, being closer in terms of phytogeography to Kazakhstan and Kirghizstan. The eastern borders of many Middle Asian, or even more broadly, Mediterranean species cross Xinjiang; these species do not reach other Chinese provinces in their distribution. The northern part of Xinjiang is in vicinity of boreal mountains of southern Siberia, and its southern border lies in western Himalaya. Thus the Xinjiang flora, belonging in general to Central Asian floristic area (Wu, Wu, 1998; Takhtajan, 1970) is situated at the cross of different botanico-geographical provinces.

The check of the large Umbelliferae collections kept in Institute of Biology, Pedology and Desert Investigations, Ürtümqi (XJBI) made during the visit of Prof. M. G. Pimenov and Dr. E. V. Kljuykov in collaboration with Prof. Shen Kuan-Mien, yielded some interesting novelties for Xinjiang Umbelliferae flora; some of them are also the new taxa for Chinese flora as a whole.

1 New genera for Chinese flora

1.1 *Zosima* Hoffm.

This small genus with four species only, belonging to the tribe Tordylieae, is indicated here for the Chinese flora for the first time. This indication is based on a collection of *Z. korovinii* Pimenov from Wuqia, Xinjiang [Yan-Fu Zhang s. n. (XJBI)]. Earlier the species was known only for Kirghizstan (it was described from Boom canyon in Kirghiz Alatau Mts., N Tianshan), Kazakhstan, and Tadzhikistan. A short nomenclatural summary for *Z. korovinii* is done below.

Z. korovinii Pimenov in Bull. Horti Bot. Princ. Acad. Sci. URSS 101: 45. 1976. TYPE: "Asia Media, jugum Kirghisicum, pars orientalis, vallis fluvii Tschu, angustis Boam, 1970-05-27, M. G. Pimenov 11" (holotype, LE!).

Z. tordylioides auct. non Korovin; Schischk. in Fl. URSS 17: 267. 1951.

1.2 *Lithosciadium* Turcz.

Described in the midst of the 19th century (Turczaninow, 1844), this genus was later included in *Cnidium* Cuss. ex Juss. and was not in common usage for a long time. *Cnidium* in its presently accepted circumscription is clearly an unnatural genus (Pimenov *et al.*, 1986) to be split in natural generic taxa, one of which is *Lithosciadium*. Its difference from *Cnidium* [type: *Cnidium monnieri* (L.) Cusson ex Juss.] is rather considerable in the scale of generic delimitation criteria in the Umbelliferae: exocarp interrupting near the base of marginal ribs (not near the column), dorsal and marginal ribs keeled (not aliform), endocarp unilayered (in *C. monnieri*, bilayered), petals greenish or reddish-brown (not white), petioles round, solid, with secretory ducts dispersed in whole parenchyma (not V-like in cross section, fistulose, with secretory ducts situated near collenchyma and vascular bundles), bracteoles linear, herbaceous (not almost completely membranaceous or with the ciliate margin), stems numerous, branching on the base (not solitary, branching in middle and upper parts).

Lithosciadium was described as a monotypic genus, and its only species (naturally, type) is *L. multicaule* Turcz. [*Cnidium multicaule* (Turcz.) Ledeb.], distributed in southern Siberia (Krasnojarsk Terr., Tuva, Irkutsk d., Burjatia, Chita d.) and north Mongolia. Recently a second species, closely related to it, *C. kamelinii* V.M. Vinogr., was described (Vinogradova, 1988a); later a new combination in *Lithosciadium* has been proposed for it by one of us (see Gubanov, 1996).

L. kamelinii differs from *L. multicaule* in the following characters (Vinogradova, 1994):

“Rays of umbel 10 ~ 20. Leaf blade soft, terminal lobes of leaves incised-dentate
..... *C. multicaule* Ledeb.

Rays of umbel 25 ~ 40. Leaf blade hard, terminal lobes of leaves broadly ovate, thin serrate at margin *C. kamelinii* V. Vinogr.”

Till now *L. kamelinii* was regarded as a western Mongolian endemic (Vinogradova, 1994), but in XJBI, we determined some sheets of this species collected in neighbouring northern Xinjiang (Chinese Altai Mts.): Altai, Qinghe, 1977-07-20, s. coll. N 11784.

A short nomenclatural summary of *L. kamelinii* is done below:

L. kamelinii (V. M. Vinogr.) Pimenov in Gubanov, Consp. Fl. Outer Mong.: 79. 1996.
— *Cnidium kamelinii* V.M. Vinogr. in Novit. Syst. Pl. Vasc. 25: 122. 1988; V. M. Vinogr. in Plantae As. Centr. 10: 41. tab. 7. fig. 1, map 1. 1994. TYPE: “Altai Mongolicus, systema fl. Bulgan-Gol, in fluxu superiore angustiarum fl. Uljastyjn-Gol, ad affluxionas sinistras, 1984-07-09, R. V. Kamelin, Sch. Darijma 306” (holotype, LE!).

1.3 *Lomatocarpa* Pimenov.

The species *L. albomarginata* (Schrenk) Pimenov et Lavrova is widely distributed in Tianshan Mts. (including Dzhungar Alatau) in Kazakhstan, Kirghizstan, and Tadzhikistan (Pimenov, 1983), but never has been indicated for China. We found in XJBI two sheets of this species collected in Xinjiang: Tashkurgan, 1978-07-12, Xinjiang Expt., NW Inst. Bot., Chinese Academy of Sciences N 1383 and 1978-07-13, Xinjiang Expt., NW Inst. Bot., Chinese Academy of Sciences N 1395.

This species belongs to the circle of high-mountain taxa, the majority of which were erroneously referred to the genus *Pachypleurum* Ledeb. The latter traditionally included various dwarf alpine

Umbelliferae, usually with leafless stems and solitary compact umbels. The fruit structure of them appeared to be very different (Pimenov, 1982, 1975; Pimenov, Sdobnina, 1973). The similarity among *Pachypleurum* s. l. species was treated as ecological convergence, the genus being limited by two species only [Siberian *P. alpinum* Ledeb. and European *P. mutellinoides* (Crantz) Holub]. *Lomatocarpa albomarginata* has solitary vittae in mericarp furrows (seen not in each furrow) in the contrast of *P. alpinum* (generic type), having numerous cyclic small ducts situated around endosperm. *L. albomarginata* was previously known in Russian taxonomic literature under illegitimate name of *P. aemulans* Korovin (Korovin, 1963) and was later separated into genus *Alposelinum* Pimenov, described alongside with another Middle-Asiatic species of the same group, *Lomatocarpa* Pimenov (Pimenov, 1982). Further comparative investigation of more complete set of species from *Ligusticum*-group ("Foeniculinae") with use of the cluster-analysis showed, however, that the difference between *Alposelinum* and *Lomatocarpa* is not so impressive as among other genera under comparison, and *Alposelinum* was reduced to a section of *Lomatocarpa* (Lavrova et al., 1987).

L. albomarginata (Schrenk) Pimenov et Lavrova in Bot. Zhurn. 72 (1): 35. 1987. — *Neogaya simplex* (L.) Meisn. var. *albomarginata* Schrenk in Fisch. et C. A. Mey. Enum. Pl. Nov. Schrenk 2: 41. 1842. — *Pachypleurum albomarginatum* (Schrenk) Rupr. in Mem. Acad. Sci. St. Petersb. (Sci. Phys.-Math.) ser. 7, 14, 4 (Sert. Tianschan.): 49. 1869. — *Neogaya albomarginata* (Schrenk). O. et B. Fedtsch. in Conspect. Fl. Turk. 3: 97. 1909. — *Alposelinum albomarginatum* (Schrenk) Pimenov in Bull. Soc. Nat. Mosc., div. biol. 87 (1): 113. 1982. TYPE: "Songarei, Dshatyk, 1841-07-22, A. Schrenk 851" (holotype, LE!).

Pachypleurum aemulans Korovin in Fl. Kazakhst. 6: 309, nom. inval., descr. ross. 1963.

P. alpinum auct. non Ledeb.: Schischk. in Fl. URSS 16: 579. 1950, p. p.

2 Two genera new for Xinjiang

We regarded here *Pleurospermum* Hoffm. s. str. as a genus indicated for the first time for Xinjiang, although three species of *Pleurospermum* s. l. were listed for the province earlier, for instance in Fl. Reip. Pop. Sin. (Fu, Ho, 1979). One of these species is "*P. lindleyanum* (Lipsky) B. Fedtsch." According to our revision (Pimenov, Kljuykov, 2000), it belongs to the genus *Hymenidium* Lindl. under correct name of *H. nanum* (Rupr.) Pimenov et Kljuykov. Two other "*Pleurospermums*" indicated for Xinjiang in this "Flora", *P. simplex* (Rupr.) Drude and *P. rupestre* (Popov) K. T. Fu et Y. C. Ho, are to be regarded in the genus *Aulacospermum*.

The genus *Aulacospermum* Ledeb. is not adopted in Fl. Reip. Pop. Sin., but it is a good genus with maximum diversity in the Middle Asia and adjacent territories. It differs from *Pleurospermum* s. str. [type: *P. austriacum* (L.) Hoffm.] in some characters of fruit anatomy (inflated ribs with several rib secretory ducts and narrow furrows in *Pleurospermum* vs. thin ribs with the absence of such ducts and large furrows in *Aulacospermum*).

A. rupestre Popov [*P. rupestre* (Popov) K. T. Fu et Y. C. Ho], the type material (holotype) of which has been studied by us in AA, is undoubtedly a synonym of *A. simplex* Rupr., widely distributed in Tianshan Mts. Pictures in Fl. Reip. Pop. Sin. [vol. 55 (1): plates 83 and 84] illustrate perhaps different plants, one having solitary, and another several (3) vallecular vittae. Plant with solitary vitta, named *P. simplex*, does not correspond to true *A. simplex*, having several vallecular ducts in mericarps, and might be identical with *A. roseum* Korovin, which spreads in Pamiro-Alai rather near Chinese border. But we saw no material from Xinjiang with such characters. After rejection of *A. rupestre*, three species of *Aulacospermum* remain in Xinjiang flora, *A. anomalum* (Ledeb.) Ledeb., *A. simplex* Rupr., and *A. gonocaulum* Popov (see below).

Pleurosperrum s. str. is also distributed in Xinjiang. Now some sheets of *P. uralense*, the species closely related to type species of the genus, *P. austriacum* (L.) Hoffm., were found in XJBI, collected in some localities of Chinese Altai Mts. [Habahe, under *Betula* forest in valley, alt. 1100 m, 1976-07-22, s. coll. 10799 (XJBI)]. This is a very natural part of vast area of this boreal species, distributed in Eastern Europe, Western and Eastern Siberia, Mongolia, Russian Far East, Japan, Korea and some provinces of NE and N China. A part of southern border of *P. uralense* and the genus *Pleurosperrum* as a whole crosses Xinjiang.

A second new Umbelliferae genus for Xinjiang, known for some other provinces of China (Gansu, Qinghai, Nei Monggol, Ningxia, Hebei, Heilongjiang) is *Kadenia* Lavrova et V. N. Tikhom. This is a segregate of *Cnidium* Cusson ex Juss., composed of by two closely related species, widely distributed Eurosiberian *K. dubia* and *K. salina*, replacing it easternmore (Pimenov et al., 1986). The latter had not been indicated previously for Xinjiang, but found in PE and XJBI, collected in: "Eastern Hami, near Yiwu, 1976-08-24, Lan-Ying Han N 760621" (XJBI) and "Barkol Kazak, 1900 m, 1965-08-29, Tai-Yien Cheo N 651448 (XJBI, PE). *K. salina* is halophyte, growing on the shores of salt lakes in Central and Eastern Siberia, Mongolia, and NW, N and NE China (Gansu, Qinghai, Nei Monggol, Ningxia, Hebei, Heilongjiang).

K. salina (Turcz.) Lavrova et V. N. Tikhom. in Bull. Soc. Nat. Mosc., div. biol. 91, 3: 93. 1986. — *Cnidium salinum* Turcz. in Bull. Soc. Nat. Mosc. 17: 213. 1844. — *Ligusticum salinum* (Turcz.) Koso-Pol. in Bull. Soc. Nat. Mosc., n. s. 29: 118. 1916. — *Selinum dubium* (Schkuhr) Leute subsp. *salinum* (Turcz.) Leute in Ann. Naturhist. Mus. Wien 74: 503. tab. 16. fig. 4. 1970. — *Selinum salinum* (Turcz.) Vodop. in Fl. Centr. Sib. 2: 683. 1979. TYPE: "In salsis Dahuriae atque prope salinas Selengenses, 1829, N. S. Turczaninow (holotype, LE!).

Ligusticum tibeticum H. Wolff in Feddes Repert. 27: 317. 1930. TYPE: China. "Gansu, ca. 4800 m s. m. S. J. Licent 4810" (lectotype, here designated, P! isotype, PE!); "Tibet altissima, Kokonor, Futterer, Holderer" (syntype); "Kokonor, 1923-08-10, Andersson 1215" (syntype).

3 A note on the genus *Dimorphosciadium* and *Chamaesciadium acaule* var. *simplex*

Dimorphosciadium Pimenov is a high-mountain genus, segregated from *Pachypleurum* Ledeb. *P. gaioides* Regel et Schmalh., a type of *Dimorphosciadium*, differs from true *Pachypleurum* species in fruit (secretory system, rib development) and synflorescence structure. It is a rather rare species with disjunctive area in Kirghizstan and Uzbekistan, but it has been found by us in Central Tianshan highlands near Chinese border. So it is not surprising that the species was registered (sub *P. gayoides*) for Xinjiang by Yang (1985). We found a true sheet of the species in XJBI: "Wuqua Kashgar, 3500 m, 1978-08-03, N2239". Another specimen kept in KUN: "Xingjiang, Heshou, 3500 m, 1958-08-06, Li An-Ren & Zhou Jia-Ran N7125". The Yang's indication (also under the name of *P. gayoides*) was repeated by V. M. Vinogradova (1994) without including new materials, but her treatment of the species is not quite correct. She included into *P. gaioides* other species and even genus *Lomatocarpa* Pimenov (*L. korovinii* Pimenov) from western extremity of Tianshan, as well as *Chamaesciadium acaule* (Bieb.) Boiss. var. *simplex* R. H. Shan et F. T. Pu.

Chamaesciadium C. A. Mey., a monotypic West Asian genus (described from the Caucasus), is completely absent in the Himalaya-Tianshan system. The above noted variety has been de-

scribed (Shan *et al.*, 1983) with type kept in specialized herbarium of Xinjiang Institute of Drug Control and Materia Medica in Ürümqi and was hardly available for checking. During our joint work with Ürümqi herbarium collections, this sheet was kindly submitted for our investigation. Our analysis showed that it belongs to the genus *Dimorphosciadium*, but is not identical with *D. gayoides*. Being similar in fruit morphology and anatomy, it differs from the latter in shoot structure and synflorescence morphology. It has a developed main stem (in *D. gayoides* the central umbel is sessile, i. e. the main stem is reduced) with a terminal umbel (in *D. gayoides* there are always some lateral stems with terminal or sometimes also few lateral umbels). As a result, the reproductive system in *D. gayoides* is composed of central, usually fruit-producing umbel, situated on level of ground surface, and a few lateral ones on the top of prostrate shoots, which are usually sterile.

For a second species of *Dimorphosciadium*, endemic to Xinjiang, we are proposing here a new name, dedicated to Prof. Shen Kuan-Mien, a known explorer of Xinjiang Umbelliferae and other families of local flora:

D. shenii Pimenov et Kljuykov, nom. nov. — *Chamaesciadium acaule* (M. Bieb.) Boiss. var. *simplex* R. H. Shan et F. T. Pu in Acta Phytotax. Sin. 21 (1): 81. 1983. TYPE: "Kashi, Kashi School of Health 017" (holotype, XJDC!).

Descriptio emendata:

Planta perennis monocarpica, glabra, ad 10 cm alta. Caudex eramosus; radix verticalis. Caulis solitarius, purpurascens, ramosus. Folia laminis lanceolatis, pinnatisectis, glabris, 2 ~ 4 cm longis, 1 ~ 2 cm latis, segmentis sessilibus ovatis, 4 ~ 5 mm longis, 2 ~ 4 mm latis, margine macrodentatis, apice obtusis. Umbella 4 ~ 6 cm in diam., involucri phyllis 4 ~ 6, herbaceis, integris, lineari-lanceolatis, radiis 10 ~ 12 inaequilongis, leviter scaberulis. Involucelli phylla 7 ~ 10, margine anguste albomembranacea, involucri phyllis similia. Umbellulae 8 ~ 15-flores. Dentes calycini breves, triangulati. Petala alba 1.2 mm longa, oblanceolata, apice leviter sinuata, exungiculata. Stylopodia breve conica; stylopodia longa, ad 2 mm longa, dorso reflexa. Fructus ad 3.5 mm longi, 1.5 ~ 2 mm lati, glabri; carpophorum nullum. Mericarpia ovata, dorso vix compressa, jugis aequalibus, prominulis. Commissura lata. Mesocarpium parenchymaticum; vittae numerosi, 4 ~ 6 per vallecule, commissurales 7 ~ 12. Endospermium ventre leviter concavum.

Clarification of taxonomic position of this taxon results in the complete exclusion of the genus *Chamaesciadium* from Chinese flora. Enigmatic long-distant disjunction in the area of *Ch. acaule* does not require henceforth any florogenetic explanation.

4 The species new for Xinjiang

The following species are indicated here as new for Xinjiang, and some of them are novelties for Chinese flora as a whole (for the latter ones short nomenclatural notes are added).

4.1 *Aulacospermum gonocaulum* Popov. in Bull. Soc. Nat. Mosc., n. s. 44, 2: 129. 1935. TYPE: "Jugum Transili Alatau, declivum dextrum rupestre rivulum Alma-Atinka minoris, infra Medeo, inter arbores et frutices, 1933-06-18, M. G. Popov s. n." (holotype, MW!).

This species frequently was regarded as a taxonomic synonym of *A. anomalum* Ledeb. (Korovin, 1963; Schischkin, 1950), but our investigations in Kazakhstan showed its independent status. The area of *A. gonocaulum* is situated southernmore of area of *A. anomalum*, and ecologically the former is more xerophile species than the latter. *A. gonocaulum* never was indicated for China. Among the collections in XJBI, there is a sheet of this species from Xinjiang: Giabahedou, Ili, Xinyuan, 1973-06-16, *Ferula* Expt. s. n.

4.2 *Bupleurum gulczense* O. et B. Fedtsch. in Acta Horti Petrop. 28: 18. 1907. TYPE: Kir-

ghizstan "Montes Alaici, inter Gulcza et Ljanger, 1901-08-15, O. A. et B. A. Fedtschenko" (holotype, LE!).

This species was found by us in NAS collections (Xinjiang, sine loco, s. coll. N 222716), being wrongly identified as *B. euphorbioides* Nakai. The last species is distributed only in NE China, Korea and the southern part of Russian Far East. *B. gulczense* is nearer to *B. multinerve* DC. These two species are closely related and vicariant, but they clearly differ in number (4 in *B. gulczense*, 5~7 in *B. multinerve*) and shape of involucellar bracts. These bracts in *B. gulczense* exceed partial umbel rays, being attenuate at the top. The bases of stem leaves in *B. gulczense*, on the contrary of *B. multinerve*, are not auriculate. The main area of *B. gulczense* lies in Kirghizstan; in Tadzhikistan and Xinjiang only solitary locations are known.

4.3 *Conioselinum papyraceum* (C. B. Clarke) Pimenov et Kljuykov in Bot. Zhurn. 84. 3: 91. 1999. — *Selinum papyraceum* C. B. Clarke in Hook. f., Fl. Brit. Ind. 2: 701. 1879. — *Cortia papyracea* (C. B. Clarke) Leute in Ann. Naturhist. Mus. Wien 73: 84. 1969. TYPE: "From Baltistan and Kashmir to Sikkim, alt. 8000~12000 ft., C. B. Clarke, 31047" (holotype, K).

Conioselinum schugnanicum B. Fedtsch. in Trav. Mus. Bot. Acad. Sci. Petersb. 1: 135. 1902. TYPE: "In valle fl. Gunt prope Rivak, in frutices, 1901-07-29, B. A. Fedtschenko" (syntype, LE!); "A castellum Chorog ad pag. Rivak, ad riuorum et rivulorum margines, in frutices, 1901-07-29, B. A. Fedtschenko (syntype, LE!); "In valle fl. Toguz-bulak, a locum Vankala (in fl. Gunt) ad locum Dzhilandy, 1901-07-21~31, B. A. Fedtschenko s. n." (syntype, LE!).

This is also an addition to Chinese flora. There are some collections in XJBI from southern part of Xinjiang. This species was independently described from the Himalaya as *Selinum papyraceum* C. B. Clarke and from Middle Asia (Pamir Mts.) as *Conioselinum schugnanicum* B. Fedtsch. Its characters show it a typical *Conioselinum*, closely related to *C. vaginatum* (Spreng.) Thell, but the epithet of priority is "*papyraceum*" (Pimenov, Kljuykov, 1999). Proposing a new combination we also suggested that the species could be found in China, and this suggestion was soon confirmed.

The species is distributed in India, Pakistan, Afghanistan, Tadzhikistan, Uzbekistan, Kirghizstan, and Xinjiang.

4.4 *Ferula leiophylla* Korovin in Gen. Ferula Monogr. Ill. 44, tab. 20. fig. 2. 1947. TYPE: "Distr. Kapal, steppa arenosa secundum riv. Yanag, 1915-06-09, V. S. Titov 41" (lectotype, TAK!).

Until now this species is regarded as almost fully endemic to plain Kazakhstan (the only other locality is in Kirghizstan near Kazakhstan border), but in XJBI we found one sheet of the species from Xinjiang: Ili, Xinyuan, 1700 m, 1974-07-14, s. coll. N 650470. This is floristic novelty for China. The species has ecology rather unusual for *Ferulas* — as we observed in Kazakhstan it grows in moist (at least at the first half of summer) salt habitats in association with *Phragmites australis*.

4.5 *Semenovia millefolia* (Diels) V. M. Vinogr. et Kamelin.

Four species of *Semenovia* Regel et Herder were included in Fl. Reip. Pop. Sin. (Shen, 1992), but some more can be added, being treated in this edition in *Heracleum* L. One of them is found now to be distributed in Xinjiang [S Xinjiang, near Aqqikkol Lake, 1988-07-06, Altun Mt. Science Expt. N 68084, (XJBI!)]. This is *H. millefolium* Diels. It is clearly an alien in *Heracleum*, being dissimilar in habit and some characters. With another very similar taxon it was separated by Wang Tie-Seng et Shan Ren-Hwa (Sheh et al., 1988) into a new section (Sect. *Millefolia*) of *Heracleum*, but in our opinion, this section must be raised in its taxonomic rank. *H. millefolium*

was transferred to *Semenovia* by V. M. Vinogradova and R. V. Kamelin (1986) with citation of numerous collections from Qinghai and Xizang, kept in LE. Newly collection enlarges the area of *S. millefolia* to the west, nearer to main area of the genus *Semenovia* biodiversity (area of "Flora Iranica" and Pamiro-Alai mountain system).

4.6 *Torilis japonica* (Houtt) DC.

This is a widely distributed Eurasian weed and adventive species, but it has been unknown until now for Middle Asia, where other species of the genus (*T. arvensis*, *T. leptophylla*, *T. nodosa*) grow in similar habitats. It has not been showed for Siberian flora either. The nearest regions to Xinjiang where *T. japonica* was registered earlier are Qinghai, Gansu, Xizang, Kashmir, and Pakistan. A sheet of the species has been found in PE, collected in Xinjiang. This finding shows that the species enlarge its area, most probably from Eastern Asia to west. *Torilis* is a new genus for Xinjiang.

5 Corrections for the Xinjiang Umbelliferae list

Some corrections in *Ferula*, *Seseli*, *Aphanopleura*, *Aegopodium*, and *Sium* species list of Xinjiang require short comments.

5.1 *Ferula* L.

Xinjiang is a main area of *Ferula* biodiversity in China, what is quite natural due to location of the world center of the genus in Irano-Turanian Province. For instance, in adjacent Kirghizstan and Kazakhstan we numbered 35 and 49 species of *Ferula* correspondingly (Safina, Pimenov, 1984; Pimenov, 1983). 19 species were indicated for Xinjiang in Fl. Reip. Pop. Sin. (Shen, 1992). The majority of Xinjiang species grow also in adjacent Kazakhstan and Middle Asia, and some local collections were not correctly identified due to an inavailability of comparative material, including the types of Middle-Asian species. Some species, endemics for Middle Asia (sometimes very narrow endemics) do not reach China.

One of these species is "*F. conocaula*". The true *F. conocaula* Korovin is a very narrow endemic of low mountaineous Mogoltau ridge in western extremity of W Tianshan (N Tadjikistan). It is closely related to *F. foetidissima* Regel et Schmalh., having a larger area in Tianshan and Pamiro-Alai Mts.; in particular, the latter was collected near Chinese border in Alai Mts. (Kirghizstan). The reidentification of "*F. conocaula*" from Xinjiang (Xinjiang, Wucia, 1973-06-29) as *F. foetidissima* was made in XJBI (see also, Vinogradova, 1994).

The next two species, to be excluded from the Chinese flora, are *F. sumbul* (Hook. f.) Kauffm. and *F. kirialowii* Pimenov (*F. pseudoreoselinum* auct.). These two closely related species have limited areas in the western part of mountaneous Middle Asia, the first in Pamiro-Alai (Tadzhikistan) and the second in W Tianshan (Uzbekistan, Kirghizstan, Tadzhikistan). Their distribution approaches Chinese territory nowhere. During our work in NAS and XJBI herbaria, we found some sheets identified as *F. sumbul* (*F. moschata* Koso-Pol.) or *F. kirialowii* [*F. pseudoreoselinum* (Regel et Schmalh.) Koso-Pol.]. All of them appeared to be *F. akitschkensis* B. Fedtsch. ex Koso-Pol., a rather variable species, widely distributed in Xinjiang.

F. gracilis (Ledeb.) Ledeb. must also be excluded, being a synonym of *F. caspica* M. Bieb. This synonymy was established by comparing the types of both species kept in LE. Similarly *F. lapidosa* Korovin is only an ecological form of widely distributed *F. ovina* (Boiss.) Boiss. Our investigations in its type locality in Boom canyon in Kirghizstan showed great variability in leaf dissection of *F. lapidosa*, in general not reliably differing from some rocky populations of *F. ovina*.

There are also dubious indications of some *Ferula* species for Xinjiang, *F. karataviensis* (Re-

gel et Schmalh.) Korovin and *F. lehmannii* Boiss., but the absence of available specimens for checking does not allow to establish what species these indications may be referred to.

5.2 *Seseli* L.

Two *Seseli* species from Xinjiang and adjacent Kazakhstan and Kirghizstan are to change their customary names due to the priority of epithets. In both cases this necessity is connected with the descriptions in little-known publication of H. Boissieu (1910). In this article two new species were described from "Turkestan chinois" (i. e. Xinjiang), *Seseli vaillantii* H. Boissieu and *Pituranthos pelliottii* H. Boissieu (named in honour of French collectors, Pelliot and L. Vaillant).

The first of them is known as *S. iliense* (Regel et Schmalh.) Lipsky ex B. Fedtsch., being distributed in Kazakhstan (Korovin, 1963; Pimenov, 1983) and China (Xinjiang) (regarded under *Libanotis iliensis*: Sheh, 1985; Yang, 1985). Although var. *iliense* was described earlier, in the rank of species the name *S. vaillantii* has a clear priority.

S. vaillantii H. Boissieu in Bull. Mus. Hist. Nat. Paris 16: 165. 1910. TYPE: "Turkestan chinois, prov. de Kutchar, Zamutek-Tagh, mine d'Ammonite, à 2000 m [Asie Centrale, Zamutek tagh (Ammonite)], 1907-07-30, Pelliot et L. Vaillant 382" (holotype, P!).

S. fedtschenkoanum Regel et Schmalh. var. *iliense* Regel et Schmalh. in Izv. Obsch. Lubit. Estest. Antrop. Etnogr. 34, 2: 31. 1881. — *S. iliense* (Regel et Schmalh.) Lipsky ex B. Fedtsch. in Rastit. Turkest.: 616. 1915. — *Libanotis iliensis* (Regel et Schmalh.) Korovin in Fl. Kazakhst. 6: 345. 1963. TYPE: "In valle fl. Ili in angustis Koibin. A. Regel" (lectotype, LE!).

S. altissimum Popov in Bot. Mat. Herb. Bot. Inst. Acad. Sci. USSR 8, 5: 72. 1940. TYPE: "Tianschan orientalis, regio iliensis, in angustis fluminis Tscharyn loco Kurtogai dicto, in rupibus porphyricis, 1937-08-12, M. G. Popov, V. P. Goloskokov" (holotype, AA!).

Seseli pelliottii (H. Boissieu) Pimenov et Kljuykov, in Bot. Zhurn. 85 (10): 105. 2000. — *Pituranthos pelliottii* H. Boissieu in Bull. Mus. Hist. Nat. Paris 16: 164. 1910. — *Eriocycla pelliottii* (H. Boissieu) H. Wolff in Engl. Pflanzenreich 90 (IV, 228): 106. 1927. TYPE: China. "Turkestan chinois, prov. de Kou-Tchar, vallee de Gair, a 1500 m, 1907-08-03, Pelliot et L. Vaillant 436" (holotype, P!).

Platytaenia depauperata Schischk. in Fl. URSS 17: 356. 270. 1951. — *Semenovia depauperata* (Schischk.) Manden. in Acta Thil. Bot. Inst. 20: 22. 1959. — *Zosima depauperata* (Schischk.) M. Hiroe in Umbell. World: 1761. 1979. — *Seseli depauperatum* (Schischk.) V. M. Vinogr. in Czerep., Pl. Vasc. URSS: 30. 1981. TYPE: "Kirghizstan, Montes Tianschan, ad ripas Kiczik-Usungusch, 4 km supra ostium, in clivis herbosis lapidosisque, 1939-09-01, V. Jakovleva" (holotype, LE!).

5.3 *Aphanopleura* Boiss.

This is a small genus (6 species), distributed in Irano-Turanian region. In Fl. Reip. Pop. Sin. (Shan, 1985), two species of *Aphanopleura* were indicated for Xinjiang. Xinjiang lies on the eastern border of generic area of *Aphanopleura*, the genus being represented there by only one species, *A. capillifolia*. The indication of *A. leptoclada* is obviously wrong, because this species has westernmore distribution and does not grow even in Kazakhstan and Kirghizstan. Probably some plants of *A. capillifolia* with slightly larger terminal leaf lobes might be determined as *A. leptoclada*.

5.4 *Aegopodium* L.

The treatment of this genus in Fl. Reip. Pop. Sin. (Liou, 1985) showed presence of 5 species in China, namely *A. alpestre* Ledeb., *A. latifolium* Turcz., *A. tadshikorum* Schischk., *A. henryi* Diels, and *A. handelii* H. Wolff. Without regarding the last two species, we would like to

correct the nomenclature and distribution of the rest. It was shown (Pimenov, 1992) that *A. alpestre* is distributed in the Northern and Eastern Asia (from Altai Mts to Japan; in China: Nei Mongol, Hebei, Heilongjiang, Jilin, Liaoning), and southernmore, in the Middle Asia and Himalaya, it is replaced by the closely related but independent species *A. kashmiricum* (R. R. Stewart ex Dunn) Pimenov. Both species have thin and long horizontal rhizomes, and they differ in petal secretory system. *A. kashmiricum* with several petal oil ducts is distributed also in Xinjiang (NAS). The difference in petal secretory system in *Aegopodium* species had been noted earlier by V. M. Vinogradova (1988b), but all material with 3 ~ 4 ducts in each petal was wrongly attributed to *A. tadshikorum* only. The last species is really distributed in Xinjiang, but it is a plant with short vertical rhizomes and larger leaf lobes. Leaf dissection varies in both *A. alpestre* s.l. and *A. tadshikorum*, but these species could be easily distinguished in the field, and harder in herbarium, even in vegetative state. But broad-leaved specimens from Xinjiang were partly identified in Chinese herbaria (NAS and probably others) as *A. latifolium*, and this treatment was adopted in Fl. Reip. Pop. Sin. *A. latifolium*, however, is a narrow endemic of Southern shore of Baikal Lake only, connected with relic conifer forest vegetation, and is unknown outside this region, even in (Outer) Mongolia. The species is closely related to sympatric *A. alpestre*, also having thin horizontal rhizomes, and differs from it in leaf dissection and level of ploidy. Its inclusion in the Chinese flora was a mistake. But true *A. alpestre* has been found in Xinjiang (Tarbagatai) (XJBI). Thus we count in Xinjiang 3 *Aegopodium* species, *A. alpestre*, *A. kashmiricum*, and *A. tadshikorum*, the latter two being distributed rather widely in mountain part of the province.

5.5 *Sium* L.

Our checking of *Sium* sheets in NAS, PE and XJBI showed the absence of true *S. latifolium* in China. This Euro-Siberian species reaches foothills of Altai Mts. in Russia, and is not distributed even in Kazakhstani Altai and the valley of Irtysh River. The specimens determined as "*S. latifolium*" from Xinjiang all appeared to belong to *S. medium*, a closely related but different species, both in morphology and ecology. The distribution of *S. sisaroides* D C. in Xinjiang (Sheh, 1987) has been confirmed.

As a result, a complete corrected list of Xinjiang Umbelliferae includes now 126 species, belonging to 53 genera.

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